A Table *ſhewing, to what degree Air is compreſſible in Sea-water, at the depth of any number of feet from* 1. *to* 33. *feet or* $5\frac{1}{2}$ *fathom, and thence for any number of* $5\frac{1}{2}$ *fathoms, or* 33. *feet, to* $324\frac{1}{2}$ *fathoms or* 1947 *feet.*

SOme Members of the *Royal Society* did with two different ſorts of Inſtruments make divers Experiments for finding the *Proportions* of the *Compreſſion of Air under Water*, in the Month of *July*, at *Sheerneſs*, in the mouth of the River of *Medway*, at the time of high water, where the depth was then about 19 Fathom, and the proportion of the weight of the Salt-water to that of the ſame quantity of Freſh water, taken out of the river *Thames*, was as 41 to 42.

One of the Inſtruments was a Glaſs-bottle, that held a quart of water, having a bras ring faſtned to the mouth of it, with a valve or flap, that open'd inward, ſo well fitted, that the bottle being filled more or leſs with water, none dropp'd out though forcibly ſhaken. This, let down 33 foot into the water the mouth downwards, and after a little ſtay drawn up, was found to be ſo very near half full of water, at ſeveral trials, that it was thought fit to ſtate the Compreſſion of Air at that depth to that meaſure, which at other depths was found to hold the proportions ſet down in the Table.

The Quantity of the Compreſſion was known by weighing the Bottle with the water in it, after that a forcible depreſſion of the Flap had made way for the eruption of the Compreſt Air (which kept it up even when the bottle was placed with the mouth upwards,) and then filling the bottle full of the ſame water, and weighing it again; and laſtly by weighing the bottle after the water was all let forth; the weight whereof being deducted, the firſt quantity of water weighed juſt half as much as the ſecond, or ſo near it that the fraction was not conſiderable: Whence it was concluded, that the Quantity of the Air, that filled the bottle before it was immerſed in the water, was, at the depth of 33 feet, compreſt into half the ſpace it took up before, and ſo proportionably at other depths.

This was confirm'd by repeated Experiments made with the other Inſtrument; which was a Cylinder of Glaſs, ſome two foot long, cloſe at one end, and having the other end drawn

drawn ſmall with a lamp, and turn'd down a little way, after the manner expreſſed in *Fig.* 1. This Cylinder was immerſed perpendicularly with the crooked end uppermoſt; by which, as it ſunk in the water, the preſſure thereof did gradually force in ſo much water as thruſt out the Air proportionable to every depth, till the Cylinder was ſo far immers'd, that the hole of the crooked part of it was juſt 33 feet under water; and then it being drawn up, by meaſuring from the bottom of the Cylinder to the height of the hole in the crooked part by a pair of Compaſſes, the water was found to fill the Cylinder ſo near the half, that, the motion of the ſuperfice of the water, (which then was very ſmooth) and the minuteneſs of the difference being conſider'd, it was thought fit to ſtate it to juſt half; according to which, confirm'd by the Trials at other depths, the enſuing *Table* was computed.

The Proportion of the *Weight* of Salt-water to that of Freſh, was found by weighing ſome Ounces of both in a bottle whereof the weight was exactly known, and which was made with ſo ſmall a neck, that the addition or diminution of one ſingle drop in it was diſcernible.

The *Table* is on theſe grounds computed upon the ſuppos'd Perpendicular immerſion of a Cylinder of 60 inches, cloſe at one end, and having the open end downwards. The *firſt* Column ſhews the ſeveral depths in Feet and parts of Feet. The *ſecond*, in half Fathoms and whole Fathoms; a Fathom being ſix Engliſh feet. The *third*, the proportionable parts of Compreſſion of any Quantity of Air at the ſeveral depths in the firſt 2 Columns. The *fourth* hath theſe proportions to a Cylinder of 60 inches, expreſt in Inches and parts of Inches: which may eaſily be further calculated to any other depth deſired.

And that theſe Trials may not be thought to have been made out of meer Curioſity, they will, by conſidering and practical men, be found Uſeful for thoſe, who have occaſion to dive for recovering things loſt in water, foraſmuch as by thoſe Experiments they may afore hand know, to what depth they may, when they ſink in the *Diving Bell* or other fit Inſtruments, endure the Compreſſion of the Air for reſpiration; as alſo, how they may furniſh themſelves with Air in a fit veſſel for ſupply.

The TABLE *it ſelf.*

Depth in water.		Air Compreſt.	
In Feet.	In Fath.	to parts.	to Inches.
1	0	33/34	58 4/17
2	0	33/35	56 1/7
3	1/2	33/36	55
4	0	33/37	53 19/37
5	0	33/38	52 2/19
6	1	33/39	50 10/13
7	0	33/40	49 1/2
8	0	33/41	48 2/41
8 1/4	0	6/5	48
9	1 1/2	33/42	47 6/7
10	0	33/43	46 2/43
11	0	33/44	45
12	2	33/45	44
13	0	33/46	43 1/3
14	0	33/47	42 6/47
15	2 1/2	33/48	41 1/5
16	0	33/49	40 20/49
16 1/2	0	2/3	40
17	0	33/50	39 3/5
18	3	33/51	38 12/51
19	0	33/52	38 1/13
20	0	33/53	37 12/53
21	3 1/2	33/54	36 2/3
22	0	33/55	36
23	0	33/56	35 5/14

Depth in water.		Air Compreſt.	
In Feet.	In Fath.	to parts.	to Inch.
24	4	33/57	34 42/57
25	0	33/58	34 4/29
26	0	33/59	33 21/59
27	4	33/60	33
28	0	33/61	32 28/61
29	0	33/62	31 26/31
30	5	33/63	31 3/7
31	0	33/64	30 15/16
32	0	33/65	30 30/65
33	5 1/2	1/2	30
66	11	1/3	20
99	16 1/2	1/4	15
132	22	1/5	12
165	27 1/2	1/6	10
198	33	1/7	8 4/7
231	38 1/2	1/8	7 1/2
264	44	1/9	6 6/9
297	49 1/2	1/10	6
330	55	1/11	5 8/11
363	60 1/2	1/12	5
396	66	1/13	4 8/13
429	71 1/2	1/14	4 2/7
462	77	1/15	4
495	82 1/2	1/16	3 3/4
528	88	1/17	3 9/17

Depth

Depth in water.		Air Compreſt.	
In Feet.	In Fath.	to parts.	Inch.
561	93½	1/18	3 1/3
594	99	1/19	3 3/19
627	104½	1/20	3
660	110	1/21	2 6/7
693	115½	1/22	2 8/11
726	121	1/23	2 14/23
759	126½	1/24	2 1/2
792	132	1/25	2 2/5
825	137½	1/26	2 4/13
858	143	1/27	2 2/9
891	148½	1/28	2 1/7
924	154	1/29	2 2/29
957	159½	1/30	2
990	165	1/31	1 29/31
1023	170½	1/32	1 9/16
1056	176	1/33	1 9/11
1089	181½	1/34	1 13/17
1122	187	1/35	1 5/7
1155	192½	1/36	1 2/3
1188	198	1/37	1 23/37
1221	203½	1/38	1 11/19
1254	209	1/39	1 7/13
1287	214½	1/40	1 1/2
1320	220	1/41	1 19/41

Depth in water.		Air Compreſt.	
In Feet.	In Fath.	to parts.	Inches.
1353	225½	1/42	1 3/7
1386	231	1/43	1 17/43
1419	236½	1/44	1 4/11
1452	242	1/45	1 1/3
1485	247½	1/46	1 7/23
1518	253	1/47	1 13/47
1551	258½	1/48	1 1/4
1584	264	1/49	1 11/49
1617	269½	1/50	1 1/5
1650	275	1/51	1 9/51
1683	280½	1/52	1 2/13
1716	286	1/53	1 7/53
1749	291½	1/54	1 1/9
1782	297	1/55	1 1/11
1815	302½	1/56	1 1/14
1848	308	1/57	1 1/19
1881	313½	1/58	1 1/29
1914	319	1/59	1 1/29
1947	324½	1/60	1

Extracts